REMARKS

Claims 1-7 are pending in the application. Claims 1-7 are rejected. All rejections are respectfully traversed.

Claims 1-2 and 4 are rejected under the judicially created doctrine of double patenting over claims 1, 4 and 5 of co-pending Application No. 09/930,322. Applicants respectfully submit the attached terminal disclaimer in compliance with 37 CFR 321(c), as the conflicting application is commonly owned with the present application. Please charge Deposit Account No. 50-0749 in the amount of $110.00 for the terminal disclaimer fee pursuant to 37 CFR 1.20(d).

The invention simulates motion of a static 3D physical object in a static scene, see Figure 9. For example, the object is a toy wooden car, and the scene is a white paper backdrop. A 3D graphics model is acquired of the 3D object and the scene. A projector is then registered with the 3D object, the scene and the 3D graphics model. The 3D graphics model is segmented into a plurality of parts, e.g., the wheels, the car body, and road, the countryside. The parts are edited to reflect a desired appearance and virtual motion of each part. For example, the wheel parts are made to rotate, while the road moves backwards underneath, and the countryside slides by. The edited parts are rendered as an animation video. Finally, the object and scene are illuminated with the video to give the appearance of the car speeding down the road through the countryside.

Claims 1 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Stegmann et al. (6,415,050 - Stegmann) in view of LaChapelle et al. (6,163,322 - LaChapelle).

Like the invention, Stegmann has a 3D model of an object and projects a 2D design onto the object. However, nowhere does Stegmann consider the *scene* in which the object is placed. Stegmann does not acquire a 3D model of a scene. Nor does Stegmann project anything onto the scene.

Because the Stegmann method does not consider anything but the object a true virtual reality environment cannot be obtained. For example, the present invention can give the illusion of a car speeding down a road, even though the real world object and real world background remain in a fixed relationship to each other. The invention can make a plane move through the sky, or if the scene is a sea, a boat can be made to sail through the waves. It is the differential rendering of the object and the scene that gives the claimed desired appearance and virtual motion of the object through the scene.

The Examiner cites column 1, lines 5-10, "This invention relates to a Virtual Design System that uses a mathematical *3D model of a real world object*, performs an application of a design on that model, and which can be combined with an Optical Projection System to visualize the design and/or design data on *the real world object*."

However, all that is mentioned here is the object. There is no consideration of a scene of any kind.

Applicants respectfully request which word, or phrase in this cited section refers to the 'scene' in which the Stegmann object is placed. Lacking a scene severely limits the 3D virtual realism possible. The claimed invention models and renders a scene as well as the object.

The Examiner cites column 1, lines 15-25, "This includes the representation of *an object* from different perspectives, change of light sources, shadowing, rendering, animation, and related features. These standard systems represent *a real world object* internally as a mathematical model, which incorporates the three-dimensional data of *the object* in form of primitives such as lines, polygons and solid bodies, and an instruction set of the operations which can be performed to manipulate the data. Application of designs on *3D objects* with help of these systems is done in the form of rendering techniques. Bitmap patterns are projected on the *3D-object* for visualization purposes only, this is called texture mapping."

It is quite clear that this cited section also disregards the modeling and rendering of the scene in which the object is placed. Applicants respectfully request the Examiner to point out, which word(s) in this paragraph means 'scene.'

The Examiner cites columns 1, lines 58-63, "engineering (providing the possibility to give instant feedback to the providers of the CAD model or the technical designers) and marketing or sales (for example for the presentation of the decorated CAD model to a customer, or for the generation of a computer animation)."

There is no scene here.

Stegmann lack all of the following elements of claim 1,

"acquiring a 3D graphics model of the scene,"

"registering a projector with the scene,"

"segmenting the 3D graphics model" having a scene parts

"editing each of the part" including the scene parts," and

"illuminating the scene to give the scene the desired appearance and virtual motion."

In addition, Stegmann only considers static images. Nowhere in Stegmann is there any indication that the rendered images give an appearance of motion. Stegmann does not produce an animation video to decorate both an object and a scene.

It should be obvious to one of ordinary skill in the art that an object in a void, as in Stegmann, can never be given the appearance of moving with respect to the void.

In sum, Stegmann does not perform *any* of the six claimed steps. Therefore, no matter what additional art is applied, Stegmann in combination with anything, other than the present invention, can never teach, suggest, show or describe what is claimed.

LaChapelle only deals with animating body parts. LaChapelle does not provide the required scene as claimed. LaChapelle does not cure the numerous defects in Stegmann. Stegmann in combination with LaChapelle does not make the invention obvious.

Furthermore, LaChapelle cannot be combined with Stegmann. LaChapelle models synthetic objects, not real world objects. Furthermore, LaChapelle does not consider how to project his animation onto a real world 3D object as required to be combined with Stegmann. LaChapelle outputs only to a flat screen.

Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Stegmann in view of LaChapelle et al. in view of Reinhardt et al. (6,281,904 – Reinhardt).

The invention edits view-independent texture and view-dependent material characteristics of a 3D graphics model to reflect a desired appearance.

Column 23, lines 34-44 describe a view-independent texture image. However, this paragraph does not describe the claimed view-dependent material characteristics. Instead Reinhardt eliminates specular lighting effects that are view angle dependent. There the dependency is an viewing angle, and not the material characteristics. Viewing angles do not make view-dependent material obvious. In any case, whatever the effect is, Reinhardt eliminates it. Something that has been eliminated cannot be edited as claimed.

In addition, there is nothing in Reinhardt to suggest that that output can be projected onto a 3D real world object. Thus, Reinhardt's images cannot be combined with Stegmann.

The invention claims a rendering of parts of an object and scene while considering a user location and a location of a virtual light. The point here is that as a user walks around a 3D object, which is being illuminated, the appearance should change depending on the location of the light source. For example, if the virtual light source is a "sun," then some parts of the object should be in a virtual shadow, while other parts are not. However, Reinhardt does suggest that a user can walk around a 3D object onto which a animation is projected, and as the user switches location, the appearance of the object changes accordingly. The paragraph cited by the Examiner does exactly the opposite, that is, "to eliminate artifacts from specular lighting."

Neither does the cited paragraph suggest "adding reflections and global visual effects." Reinhart only "provides for extracting and *eliminating* specular lighting effects. Nothing is added, instead it is subtracted. Global visual effects are not discussed.

Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Stegmann in view of LaChapelle et al. in view of Sakaguchi (6,310,627).

The invention claims editing independent rotation and translation parameters for each part of a 3D model of a 3D object to ascribe different virtual motions to the plurality of parts.

Sakaguchi generates frame images by "adjusting the rotation and/or movement amounts of lower parts according to the rotation and/or movement amounts of upper parts." Sakaguchi does not describe editing rotation and translation parameters. The only parameters described in Sakaguchi are "deformation parameters of the standard garment C based on the figure of the client." Translation is not addressed at all.

Sakaguchi cannot be combined with Stegmann, because the output is to an image window of a flat screen, and not to a 3D object.

Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Stegmann in view of LaChapelle et al. in view of Cohen (5,831,627).

The invention adds motion blur and moving shadows to the object and the scene.

At column 1, lines 5-11, Cohen describes an "animation techniques to display moving objects on a video monitor." That is not the claimed illumination of an animation video onto a 3D real world object. The flat screen image space of a video monitor is not a 3D object. It is well known in the art that "motion blur" is a visual effect that gives an object the appearance of moving rapidly. There is nothing in Cohen to indicate that his technique can be applied to 3D real world objects.

In view of the foregoing, it is respectfully submitted that the application is in condition for allowance and an early indication of the same is courteously solicited. The Examiner is respectfully requested to contact the undersigned by telephone at the below listed telephone number, in order to expedite resolution of any remaining issues and further to expedite passage of the application to issue, if any further comments, questions or suggestions arise in connection with the application.

To the extent necessary, a petition for an extension of time under 37 C.F.R. 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account 50-0749 and please credit any excess fees to such deposit account.

Respectfully submitted,
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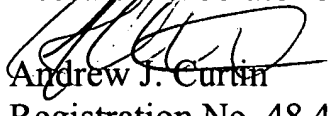

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